

**The Determinants of participation in microfinance and its impact on rural welfare: Case Study of the National Development Bank Botswana's Temo Bokamoso Lending programme in Kweneng District.**

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by

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## **PLAGIARISM DECLARATION**

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## **ABSTRACT**

This thesis investigates the determinants of participation in microfinance programmes and its impact on rural welfare in order to suggest improvements to the level of participation and the effectiveness of the programmes. The level of participation by rural smallholders in Botswana is much lower than expected in spite of the availability of schemes and their ease of access. The study uses one of National Development Bank Botswana's credit schemes in Kweneng District to investigate this problem. A field survey was carried out on 112 smallholder farmers, half of whom are scheme participants, to establish what factors affect the probability of their participation in the scheme. The study applied a logit model to determine which variables significantly affected the probability of participation in the credit scheme. The results indicated that some variables like gender and educational status had little effect on the probability of participation. A number of policy variables which include age, previous experience of credit use, respondents' perception of group collateral, distance from the National Development Bank, access to irrigation and total landholding size were found to have a significant effect. On the welfare effect, more than half of participants in the microfinance credit scheme indicated that their welfare improved as a direct result of the programme. As future research, it would be useful if the study could be extended to all districts of the country to enable the generalization of findings and provide valuable information for agricultural and poverty alleviation policy purposes.

## TABLE OF CONTENTS

### Contents

<b>PLAGIARISM DECLARATION .....</b>	<b>i</b>
<b>ABSTRACT.....</b>	<b>ii</b>
<b>TABLE OF CONTENTS .....</b>	<b>iii</b>
<b>LIST OF TABLES.....</b>	<b>vi</b>
<b>GLOSSARY OF TERMS.....</b>	<b>vii</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>viii</b>
<b>CHAPTER ONE: INTRODUCTION.....</b>	<b>1</b>
1.1 Background of the study .....	1
1.2 Problem statement .....	5
1.3 Research questions.....	6
1.4 Research Objectives.....	7
1.5 Research hypotheses .....	8
1.6 Significance of the study .....	8
<b>CHAPTER TWO: Literature Review.....</b>	<b>10</b>
2.1 Review of major theoretical models .....	10
2.1.1 Participation in credit markets .....	10
2.1.2 Models of financial market development .....	12
2.2 Empirical review of literature.....	18
2.2.1 Studies on credit markets in developing countries .....	18
2.2.2 Studies on the characteristics of rural credit markets .....	22
2.3 Microfinance and welfare in theory.....	26
2.4 Empirical review of Microfinance impact on welfare .....	27
2.5 Botswana's financial sector .....	30
2.6 Conclusion.....	31
<b>CHAPTER THREE: RESEARCH METHODOLOGY.....</b>	<b>33</b>
3.1 Introduction .....	33
3.2. The Conceptual Framework .....	33
3.2.1. Socio-Economic Features of the Farmer and Credit Participation.....	33
3.2.2. Farm Characteristics and Credit Market Participation .....	36
3.2.3. Institutional Characteristics .....	36

3.3 Study area.....	36
3.3.1. Economy of Kweneng district .....	37
3.4 Research Design .....	38
3.5. Sampling Procedure and Data Collection .....	38
3.6. Econometric model: logistic regression .....	39
3.7. Model specification.....	40
3.8 Definitions of variables .....	42
3.8.1 Dependent variable .....	42
3.8.2 Independent variables.....	42
3.9 Conclusion.....	43
<b>CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS .....</b>	<b>44</b>
4.1 Introduction .....	44
4.2. Socio demographic characteristics of respondents .....	44
4.2.1 Respondent Age .....	44
4.2.2 Educational status of the respondents .....	45
4.3 Respondents socio-economic characteristics and farm characteristic.....	46
4.3.1 Total land holding of respondents.....	46
4.3.2 Cash value of respondents' livestock .....	46
4.3.3 Cash value of respondents' other assets .....	46
4.3.4 Respondents number of dependents .....	47
4.3.5 Distance from microfinance institutions.....	47
4.3.6 Income from non-farming activities.....	49
4.3.7 Pattern of overall income- a welfare analysis .....	50
4.4 Econometric result analysis .....	51
4.4.1 Diagnostic tests .....	51
4.4.2 Results of the logit model .....	52
4.4.3 Explanation of significant independent variables- (Farmer characteristic) .....	52
4.4.4 Non-statistically significant variables for the farmer's characteristic .....	54
4.4.5 Explanation of the results for farm characteristics' variables .....	55
4.4.6 Explanation of the institutional variables .....	56
<b>CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS.....</b>	<b>57</b>
5.1 Conclusion.....	57
5.2. Recommendations.....	58

5.2.1. Policies that address the farmer’s socio-economic characteristics.....	58
5.2.2. Policies that address the farm characteristics.....	59
5.2.3. Policies that address the Institutional characteristics .....	59
5.3 Limitations of the study .....	60
5.4 Areas of further study .....	60
<b>REFERENCES.....</b>	<b>61</b>
<b>Appendix I - Questionnaire.....</b>	<b>66</b>
<b>Appendix II Output from Home Stata.....</b>	<b>70</b>

## **LIST OF TABLES**

Table 3.1 Population of Kweneng district

Table 3.2 Summary of the variables

Table 4.1 Age group of the respondents

Table 4.2 Sample Respondents Level of education

Table 4.3: Summary of descriptive statistics (continuous variables)

Table 4.4 Selected socio economic and institutional discrete variables

Table 4.5 Annual Income from non-farming activities

Table 4.6 Pattern of household income

Table 4.7 Logit model's maximum likelihood estimates on dependent variable (PART)



## **GLOSSARY OF TERMS**

ADB	African Development Bank
APP	African Progress Panel
BAMB	Botswana Agricultural Marketing Board
BBS	Botswana Building Society
BOB	Bank of Botswana
CEDA	Citizen Enterprise Development Authority
DFI	Development Finance Institution
FAO	Food and Agriculture Organisation
FDC	Fixed Debt Contract
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IFS	Informal Finance Sector
IMF	International Monetary Fund
ISO	International Organisation for Standards
LEA	Local Enterprise Authority
MFDP	Ministry of Finance and Development Planning
MOA	Ministry of Agriculture
NDB	National Development Bank
ROSCA	Rotating Savings and Credit Association
SAP	Structural Adjustment Programme
TBCS	Temo Bokamoso Credit Scheme

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## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the study**

Over the last 60 years, credit programmes have been set up in most developing countries by governments and donors with the aim of improving the access to credit of rural households. A great number of these, especially the ‘agricultural development banks’, have failed to significantly alleviate poverty or to be financially sustainable. Most rural households continue to rely on the informal market for their inter-temporal transfer of resources. Therefore, outreach of financial institutions and access to financial services has become a major issue in microfinance, and particularly in rural finance (Diagne *et al.* 2001; Meyer, 2015).

According to the International Fund for Agriculture Development (IFAD, 2011) and the Africa Progress Panel among others, Africa needs to unlock its agriculture potential in order to unlock its development. Farming is the primary source of livelihood in Africa: over two-thirds of its citizens depend on agriculture and its related industries for their livelihoods. Investing in agriculture will go a long way towards reducing poverty in Africa. According to an FAO sectoral analysis, agricultural sector growth is preferable to growth in other sectors as it is 11 times more effective at alleviating poverty in sub-Saharan Africa. About a third of the continent’s GDP is derived from agriculture, with the proportion being significantly higher for many sub-Saharan countries. Smallholder farmers can contribute significantly to lifting their communities out of poverty and stimulating the economy. Providing them with access to finance for their agricultural activities enables them to generate more income, creating a multiplier effect as it enables them to educate

their children, access better healthcare and invest in small business activities to diversify their income. All of this contributes to help lift their community out of poverty for the long term. Research by ONE, a global advocacy group founded by U2 lead singer Bono found that crucially, if women farmers in Africa received equal investment, agricultural productivity could be raised by 20-30%, which would reduce the numbers of those facing starvation by 100-150 million, increase output available for the markets, increase incomes and reduce dependency for women, and provide more food for children (ONE, 2014).

Unlike most of Africa where majority of smallholders are left out of the rural financial system, many reports, notably Akinboade (1998) suggest that in Botswana there are multiple government programmes and credit houses offering services to the rural community. In addition, the low population density means that land constraints, which are the second biggest stumbling block for most of Africa's rural communities from maximizing the benefits that access to credit offers, is less of a consideration. Botswana's National Development Bank (NDB), and the Citizen Entrepreneurship Development Agency (CEDA), are still providing access to finance to rural farmers while their peers have mostly shut down or been offloaded by governments all over Africa. In Botswana, like in most developing countries, there is also a significant number of informal financial sector (IFS) organisations. These include money lenders, Rotating Saving and Credit Associations (ROSCAs), Cooperative Schemes, pawnshops, and small professional microfinance institutions (Okurut and Botlhole, 2006; Ledgerwood *et al*, 2013). However, in spite of the multiple government financed credit schemes and the ease of access to these schemes, participation is low in the rural areas where farming is predominantly done by smallholder farmers (NDB,

2014). The NDB and CEDA both report that a very high proportion of the funds available for credit to farmers are unused because of lack of applicants. It is not clear at this stage why participation in these schemes are so low, and what characteristics are shared by those who make the decision to participate in them, as no research has specifically addressed the issue to date, leading to the decision to undertake this study.

The population of Botswana is currently estimated to be about 2 million, and it is classified as an upper middle income country, with per capita income in excess of 5,000 US Dollars (LEA, 2014). Botswana's economic performance improved in 2013, with a diversification drive yielding a GDP growth rate of 5.4% mainly driven by service oriented sectors, notably trade, transport and communications, though mining and agriculture still happen to be the main economic activities (ADB, 2014). The National Development Bank of Botswana (NDB) was established under an Act of Parliament in 1963. It is owned by the Government of Botswana and managed by a Board of Directors appointed by the Minister of Finance and Development Planning. According to its information booklet, NDB's main activity is the provision of finance to the business sector in order to stimulate growth and entrepreneurship, while aiming to earn satisfactory returns and be sustainable. As a Development Financial Institution (DFI), NDB plays a vital role in the execution of national strategy. Job creation, economic diversification, the promotion of local enterprise, the development of agriculture, the alleviation of poverty especially in the rural areas and a reduction of rural-urban migration are key strategic objectives included in Botswana's Vision 2016 and the National Development Plan prepared by the Ministry of Finance and Development Planning (MFDP). NDB continues to contribute immensely to these objectives and the growth of the local economy in general. NDB supports the business community regardless of size or sector they may

operate in. The range of clients include small, medium or large-scale enterprises and/or projects. They however have some schemes that are targeted at specific sectors, depending on which sectors' development the government policy is prioritising at any one time. In 1998, NDB became the first bank on the African continent to be certified under ISO 9001:2000 International Quality Standards. Some of the activities that NDB finances are Manufacturing, Commercial/Retail, Agriculture, Human Capital Development and Property. NDB is also the primary provider of formal finance to smallholder farmers in Botswana through its Temo Bokamoso loan scheme (TBCS). This scheme was launched in 2008 in order to encourage agricultural activity in the rural areas to alleviate poverty and stem the flow of rural-urban migration. The scheme is for loans of up to P250, 000 (USD25, 000) for terms of up to a maximum of 7 years (NDB, 2013).

Botswana's population is largely rural, with farming being the main activity after mining. Kweneng district is situated just outside Gaborone and is a rural agricultural district with a significant population of smallholder farmers whose participation rate in the Temo Bokamoso credit scheme is around the national average (NDB, 2013). Agricultural activity in Kweneng focuses on vegetable cultivation on smallholdings of under 10 hectares on average (Statistics Botswana, 2014). Participants in the Temo Bokamoso Credit Scheme rely on it for a number of purposes: the purchase of seasonal inputs (ploughing costs, seeds, fertilizer, maintenance costs, etc); field development (fencing, de-stumping, etc.); field purchase (Only fields with title deeds are financed); purchase of farm machinery and implements (tractors, boreholes drilling and equipping, threshers, chaff cutters etc); and the purchase of farm vehicles, e.g. vans/bakkies, trailers, carts etc.

Income inequalities and poverty within rural communities can be reduced by financial development (Aghion, Caroli & Garcia-Penalosa, 1999; Meyer, 2015). The NDB, through its Temo Bokamoso loan scheme thus has a key role to play in improving the lives of Botswana's rural populations, who would have difficulty accessing finance through traditional formal financial institutions.

## **1.2 Problem statement**

Many studies have been undertaken in Africa on the impact that access to credit has on rural households' welfare, and especially on poverty alleviation (Diagne *et al*, 2001; Udry, 1991; Meyer, 2015). The main limitations of those studies centred on the fact that access to formal credit is very limited in most countries, and for those who do have access, their landholdings are mostly too small to maximize the benefits of access to credit.

Very limited empirical research has been performed in this area in Botswana. Conditions in Botswana also happen to be different, which is rare in Africa. There is significant access to formal finance with NDB, CEDA, LEA and multiple other finance houses having schemes that target rural households. TBSC provides easy loans to rural farmers with little security and CEDA through its Young Farmers' Fund (YFF) for instance, provides finance for youth under 35 years of age who would be interested in taking up farming on a full time basis. Due to the low population density, there are also land reserves available for allocation by the rural land boards for those indigenes interested in farming smallholdings. These conditions are ideal for studying the determinants of

participation in credit schemes, the contribution to rural welfare made by participation in credit schemes and how participation levels can be improved.

“A household has *access* to a particular source of credit if it is *able* to borrow from that source, although for a variety of reasons it may choose not to. The extent of access to credit is measured by the maximum amount a household can borrow (its credit limit). If this amount is positive, the household is said to have access. A household is said to be *participating* if it is borrowing from a source of credit” (Diagne *et al.* 2001). Given the relative ease of access in Botswana, NDB’s 2013 annual report claims that participation in the Temo Bokamoso credit scheme is still quite low among smallholder farmers. CEDA’s YFF is also not succeeding in attracting significant numbers of young farmers to participate in the scheme. This raises a question about what factors determine participation in these formal credit schemes. Additionally, the question arises whether participation in schemes like the Temo Bokamoso really significantly improves the livelihoods and productivity of participants. These schemes are funded by the Botswana government as policy tools to stimulate agriculture and alleviate poverty. Thus the low participation is a national problem that this study seeks to investigate. If the factors that determine participation can be established, then it would be possible to structure and manage these schemes in a manner that will ensure higher participation rates.

### **1.3 Research questions**

This study aims to identify, analyze and examine the major socio-economic determinants of rural smallholders’ participation in micro-finance and its impact on their livelihoods, using NDB’s Temo Bokamoso Credit Scheme as a case study. This scheme was chosen because it is the only



scheme that specifically targets agricultural smallholders in the rural areas in order to improve their livelihoods and reduce rural-urban migration. Other schemes were considered less suitable for this research because they target women, or youth without necessarily expecting them to be residents in rural areas. They also finance other entrepreneurial activities besides farming. In order to address the research problem, the following research questions were formulated:

- (i) What are the determinants of participation in the NDB's Temo Bokamoso credit scheme for agricultural smallholders in the Kweneng district of Botswana?
- (ii) How does participation in the NDB's Temo Bokamoso credit scheme affect the incomes and productivity of agricultural smallholders in Kweneng district of Botswana?
- (iii) How can participation in the NDB's Temo Bokamoso credit scheme and its effectiveness be improved for agricultural smallholders in Kweneng district of Botswana?

#### **1.4 Research Objectives**

- (i) To investigate the determinants of participation in the NDB's Temo Bokamoso credit scheme for agricultural smallholders in the Kweneng district of Botswana.
- (ii) To examine the effect of participation in the NDB's Temo Bokamoso credit scheme on the incomes and productivity of agricultural smallholders in Kweneng District of Botswana.

- (iii) To recommend approaches to improving participation in the NDB's Temo Bokamoso credit scheme and the effectiveness of credit providers to agricultural smallholdings in Botswana.

## **1.5 Research hypotheses**

- (i) *H1: Participation in the NDB's Temo Bokamoso credit scheme by agricultural smallholders in the Kweneng district of Botswana is determined by socio-economic characteristics of the farmer, as well as the farm characteristics and institutional factors.*
- (ii) *H2: Participation in the NDB's Temo Bokamoso credit scheme leads to an improvement in the incomes and productivity of agricultural smallholders in Kweneng District of Botswana.*

## **1.6 Significance of the study**

The welfare of poor households in developing countries, especially in rural areas is constrained by lack of access to credit. For this reason most policy and research interest tends to focus on the improvement of access to credit and its impact on household welfare. This research perspective makes the rational assumption that the poor would participate if they had access to credit in order to finance both consumption and their entrepreneurial aspirations. (Dufhues and Buchenreider, 2005; Ledgerwood *et al*, 2013). An important subject to ponder for policy makers in Botswana is why enabling access to credit doesn't always lead to increased participation, and when it does, whether it is effective in improving the livelihoods of participants.

Formal rural credit is considered by the Botswana government to be a powerful tool for poverty reduction (NDB 2013). The government tried to break the dominance of the informal sector and push development by supplying credit on preferential terms, particularly to rural households through the NDB. The Botswana government has in this manner so far succeeded in providing a huge share of the population with formal credit. However, despite the immense formal outreach, the participation of formal credit is still quite low.

Any research undertaking must be purposeful and systematic (Buttel and McMichael, 2005). Thus the solid basis for this proposed research rests upon the foregoing premises: to investigate the determinants of participation in the NDB's Temo Bokamoso credit scheme for agricultural smallholders in the Kweneng district of Botswana; determine the effect of participation in the NDB's Temo Bokamoso credit scheme on the incomes and productivity of these agricultural smallholders; and the role of credit participation in achieving food security. It will also generate recommendations for policies to improve the welfare of the agricultural smallholders in the Kweneng district of Botswana. It will draw wider implications for policy makers like NDB, CEDA, and LEA to boost the overall subsector performance; and finally be able to build on the existing body of knowledge as there is an acute paucity of empirical research conducted in this field, especially on rural smallholdings in Botswana.

## **CHAPTER TWO: Literature Review**

### **2.1 Review of major theoretical models**

The theoretical models used to study and understand the determinants of participation in the Temo Bokamoso scheme are in two main groups. First, there are the models that explain why any rural smallholder or investor would choose a particular source of finance or combination of sources, including the loanable funds, liquidity preference and pecking order theories (Ndede, 2015). These three theories explain some of the factors that may have an influence on participation in a credit scheme. The second group of models provides the historical context in which financial markets developed, review how credit markets operate and what assumptions underlie the way they are structured (Conning and Udry, 2007).

#### **2.1.1 Participation in credit markets**

##### **2.1.1.1 Loanable Funds Theory**

One of the avenues available to firms and individuals for obtaining funding to finance their operations is the banks and other financial institutions which provide loans (Adekanye & Adedoyin, 1992; Pooter *et al*, 2015). Individuals and institutions who require funds seek out those who have them. The disbursement of the funds however needs to be motivated, so a price in the form of interest is charged by the providers of the funds to those in need of them. The interest rate is the price of the financial service provided with all other economic factors held constant (Ndede, 2015). The loanable funds theory states that how much funds are supplied to the market depends on the level of demand for money in the market and the interest rate (Mishkin, 2009). By the same

token, the demand for money depends on the interest rate and money supply, *ceteris paribus*. High interest rates would attract a high supply of money as the owners of funds are attracted by the high rates, but would discourage demand. When interest rates are low demand increases while supply is withdrawn from the market. The market equilibrium is at the point where the quantity demanded equals the volume that loan providers would supply at a given interest rate. The classic loanable funds theory developed by Robertson and Ohlin (1930) basically states that the interest rate is determined by the demand and supply for loanable funds, therefore implying that participation in a credit scheme (demand) would depend on the supply of credit being available at a rate that is lower than the participants can obtain elsewhere.

#### **2.1.1.2 Liquidity Preference Theory**

Keynes (1936) developed the liquidity preference theory which states that the rate of interest is determined by liquidity preference, and not demand and supply for money. Interest according to Keynesian theory, is the reward for giving up liquidity, thus the longer the period required, the higher the price charged. A lender with a high liquidity preference, meaning they would rather have cash than any other asset, would prefer short term over long term loans (Joy, 1977; Pandey, 2003; and Meyer, 2015). There are three motives for the demand for liquidity: the transactions motive; the precautionary motive and the speculative motive. The transactions motive refers to the need to meet day to day expenses. The precautionary motive is that people feel a need to hold money in case of eventualities and the speculative motive is in order to take advantage of opportunities (Keynes, 1936). The implication of the liquidity preference theory is that the term of the loan is a significant consideration in the demand for credit. In addition to the interest rate charged, another determinant for participation in a credit scheme is therefore theorized to be loan

terms offered by the scheme (Ndede, 2015). All other things being equal, farmers would prefer a longer to a shorter term loan, or they would like the credit available to them to match their cash flow cycles.

#### **2.1.1.3 Pecking Order Theory**

The pecking order theory was developed by Myers and Majluf (1984). It attempts to explain how firms select their capital structure. According to the theory, firms prioritise internal sources of finance, followed by debt, with the raising of new equity serving as a last resort. La Rocca *et al* (2009) develop this further, suggesting that firms should always employ a hierarchical approach when sourcing their finance needs. Pecking Order Theory is very relevant to this study because rural farmers tend to finance their business activities largely by themselves, then friends and family, before looking externally (Okurut *et al* 2009). Participation in the Temo Bokamoso Scheme would depend to an extent on how strongly the rural smallholders of Kweneng adhere to this theory.

#### **2.1.2 Models of financial market development**

From a historical perspective, theories on the development of rural financial markets developed alongside and were significantly influenced by more general theories of information asymmetries, banking and corporate finance (Stiglitz, 2002). A paper by Stiglitz (1974) on “Incentives and risk sharing in sharecropping” investigated the impact of moral hazard on the structure of labor, insurance and credit and equity contracts, significantly influencing subsequent research. Akerlof

(1970) was inspired by informal rural moneylenders in India in his analysis of adverse selection or the ‘lemons problem’ (Conning and Udry, 2007).

#### **2.1.2.1 The complete markets theory**

The theory of complete markets developed by Arrow and Debreu (1954) is a benchmark model for subsequent models of financial contracting. In a complete market the full set of possible bets on future states-of-the-world can be developed with current assets without friction. There are no transaction costs and every market agent can contract either directly or indirectly with every other market agent to exchange every existing good. The definition of a good in complete markets is state-contingent, including the time and environment the good is consumed in. For example, an ice cream on a hot day is a different good from an ice cream on that same day if it is cold. A market is complete if an agent can simultaneously enter into any position regarding any future state of the market. A state of the world is a complete description of a possible outcome of uncertainty. Regarding the market as a village, the consumption of each household increases the average village consumption. Idiosyncratic shocks to household income are pooled at the village level so that, a household’s consumption is not affected by its idiosyncratic income. Elaborate mechanisms to verify states and efficiently side-contract to redistribute resources between individuals in every state of the world are assumed to exist to enable this efficient risk sharing. (Conning and Udry, 2007; Ibtissem and Bouri, 2013).

#### **2.1.2.2 Efficient risk sharing hypotheses**

A number of hypotheses have emerged from the complete markets model and these have been widely tested in rural financial markets around the world. Townsend (1994) conducted a study in

rural India and found that there was risk pooling among the villagers, but rejected the hypothesis of full consumption smoothing. Risk sharing has been tested in a varying range of social groups, and each one of them found that while there was partial evidence of risk sharing within the group, it was not Pareto-efficient (Conning and Udry, 2007). Udry (1994) also rejected the hypothesis of risk sharing in a study of households in Northern Nigeria. Dercon and Krishnan (2000) performed a similar study on households in Côte d'Ivoire, Ghana, and Ethiopia, and found that there limited evidence of efficient risk sharing within the same household. The conclusion that can be drawn from these empirical studies is that risk-sharing is more effective within subgroups in a village and there are forms of imperfect consumption smoothing within rural financial markets.

#### **2.1.2.3 Significance of imperfect financial markets**

Even if a group manages to pool their risks in an efficient manner, the individuals who make up the group would still be exposed because agents need to be physically present to be able to enforce state-contingent risk-sharing arrangements and this will expose these individuals to interconnected risks (Conning and Udry, 2007). For instance, a drought will affect all the farmers in the same village so it will not make sense to exchange risks with each other. They would be better off exchanging risks with individuals in a community that is not affected by the same conditions. Since it may neither be cost-effective or convenient for each individual to separately seek out and contract with someone in a different community, specialized financial intermediaries are needed to facilitate the pooling of risks and make the cost of the transaction more amenable. This intermediation completes the market and enables society to benefit from participating in financial markets (Pooter *et al*, 2015).



#### **2.1.2.4 Relevance of asymmetric information and imperfect enforcement for financial contracts**

Considering that financial intermediation can help to complete markets, questions then arise as to why it fails to lead to efficient contracting with risk sharing agreements even in small communities and what motivates the reluctance of diversified financial intermediaries to enter rural financial markets? Conning and Udry (2007) suggest that it is due to asymmetric information. In the event of a farmer's harvest failing it is not possible for a lender to determine whether it is due to natural causes or because the farmer failed to act with diligence, or simply misrepresented the situation. If the complete markets theory were realistic, with complete information it would be possible for the lender to detect potential contract breaches and take corrective action at no additional cost. Asymmetric information and enforcement problems however prevent this (Ibtissem and Bouri, 2013). Asymmetric information is directly responsible for about 40% of the defaults in South Africa's credit markets (Karlan and Zinman, (2004).

#### **2.1.2.5 The Moral hazard problem**

A **moral hazard** is any situation in which one party to a transaction takes the decision about how much risk to take, while another party bears the cost if things go badly (Krugman, 2009). This happens due to asymmetric information in rural financial contracts, as the lender cannot accurately foresee the actions of the borrower. A lender would be reluctant to rollover a loan if a farmer claims to have lost his harvest to poor weather, unless other farmers in the area suffered the same fate (Townsend 2003). In such circumstances it is not uncommon for a lender to allow the borrower to miss a few payments or even forgive part of the loan. Udry (1994) found that state-contingent defaults were provided for in rural loan contracts in Nigeria. Agricultural contracts have always

taken this into consideration as is manifest from Hammurabi's code (circa 1795 BC) which stated that:

“If any one owes a debt for a loan, and a storm prostrates the grain, or the harvest fail, or the grain does not grow for lack of water; in that year he need not give his creditor any grain, he washes his debt-tablet in water and pays no rent for this year”.

#### **2.1.2.6 Reputation and Multi-period contracts**

Lambert (1983) and others studied what dimensions there are to the moral hazard problem in the event of a multi-period contract. In this scenario, because an agent is committed to a multi-period contract they know that their behaviour would impact their access to surplus in subsequent periods. The chances of future access are improved by building a good reputation which is like an earned privilege. The deterrent for morally hazardous actions is the opportunity that behaviour in the current period provides for building a reputation that would enhance future period incentives (Mishkin, 2009). Output contingent contracts are not necessarily easier to manage, as a farmer can decide to hide or inaccurately report his output. Even if it were possible to prevent this, the farmer could just simply decide to default. Enforcing contract obligations are difficult enough as it is in rural areas. This is why it is important for contracts to be self-enforcing, with built in incentives for desired behaviour (Conning and Udry, 2007).

#### **2.1.2.7 The use of Limited liability contracts, collateral and other incentives**

Stiglitz and Weiss (1981) pointed out the marked variance in the conditions of access to finance across households and the close link between financing terms and production activities. Within the

same region some farmers may be using commercial bank loans while others who grow the same crops and use the same distribution channels may be using much more expensive informal moneylenders. In a complete market every project that is socially profitable would be financed, without regards to the farmer's asset base or activities performed on the farm. In reality, the conditions of access are often linked to the current asset holding and the anticipated crop activity because lenders need pledges and other guarantees to satisfy them that the level of risk is acceptable (Banerjee, 2003). The initial distribution of assets within the village can therefore have a significant impact on the quantity and variety of financial contracts and intermediaries. Consider moral hazard within the example of a single period contract with a risk-neutral farmer. If the contract is a fixed debt contract (FDC) meaning the farmer has to pay irrespective of the project outcome, this will make them a full residual claimant. This contract will not be practicable if the farmer is not happy to bear the full burden in some low outcome states, for instance where his output and residual assets are insufficient to meet the payment amount (Ledgerwood *et al*, 2013). An important incentive in such a contract then would be some form of limitation of liability in the event of adverse outcomes.

#### **2.1.2.8 Impact of land tenure on credit supply**

The limitation of liability is difficult to achieve in many rural financial markets because of poorly defined or contested property rights (Deininger, 2003). De Soto (2000) discussed the fact that billions of people in poor communities all over the world possess communal rights over real estate property valued at hundreds of billions of dollars but they lack the capability to leverage those assets on the capital markets because they do not have formal legal title to the assets. These assets constitute 'dead capital' for the poor people who are their owners as in spite of their ownership

they cannot benefit from the opportunities that integration and participation in the world's capital and product markets could provide (Ibtissem and Bouri, 2013). On one hand, several studies done for India, Paraguay, Kenya and Burkina Faso found that tenure security had little effect on either investment demand or credit supply (Conning and Udry, 2007). However Field (2004) found that titling programs in Peru significantly increased loan approval rates from public (but not private) lenders while reducing the rates charged for these loans.

## **2.2 Empirical review of literature**

The theoretical literature review above discussed various models developed in a bid to understand the development and operation of financial markets. This section now explores various field studies that have contributed to and often contradicted these models by analyzing financial markets in developing countries.

### **2.2.1 Studies on credit markets in developing countries**

A significant number of analytical research studies have attempted to explain the way credit markets function by using new theoretical developments based on research in rural communities. These studies for the main part challenge the paradigm of competitive equilibrium, and explore the manner in which the realities of incomplete markets and imperfect information impact on how credit markets in developing markets function. These have led to the development of new theoretical underpinning for policy intervention. Most of this body of literature has largely followed from the seminal work of Stiglitz and Weiss (1981; Atieno, 2001; Ledgerwood *et al*, 2013). The work by Stiglitz and Weiss (1981) is essentially regarded as the first of attempts to

explain the way credit markets perform credit rationing. They found that the interest rates a financial institution charges perform a dual role. They sort potential borrowers (leading to adverse selection), and also affect how borrowers act (leading to the incentive effect). Interest rates charged may not necessarily then be the price at which demand and supply for credit coincide, but do have an impact on the nature of the transaction (Atieno, 2001).

Stiglitz and Weiss (1981) attributed this dual effect to the fact that imperfect information is an inherent feature of credit markets. The expected returns of the finance providers depends on the repayment of the credit extended so they seek borrowers who are most likely to honour their credit obligations. In this process, the lenders use the interest rate an individual is willing to pay as a screening device. This leads to adverse selection because those borrowers who are riskier may however be much more willing to pay high rates, so as the interest rate increases, the risk profile of the borrowers also worsens, impacting negatively on the lender's profitability (Ibtissem and Bouri, 2013). Changes in the interest rate and other contract terms modify the behaviour of the borrowers as they respond to the impact these changes have on the returns to their projects, leading to an incentive effect. Stiglitz and Weiss (1981) show that a problem of moral hazard arises as the rates increase because borrowers then go for projects with high potential returns even though they have much lower chances of succeeding, shifting the risk of failure to the lenders who fail to recoup the credit extended. The lenders are unable to control the actions of the borrowers due to imperfect information so they have to formulate the terms of the contract in such a manner that it would attract low risk borrowers and also motivate the borrowers to act in the lenders' interests. This leads to an equilibrium interest rate with credit demand exceeding supply. How much collateral is required and other contract terms like the amount of the loan also influence the way borrowers

behave and the returns the lenders receive (Atieno 2001; Meyer, 2015). Therefore, in situations of excess demand an increase in interest rates or collateral will not necessarily lead to more profits for the lenders and certain borrowers will inevitably be turned away (Ibtissem and Bouri, 2013). This leads to credit rationing in credit markets, a phenomenon where : (a) In spite of loan applicants appearing to be identical, some will not receive credit even if are willing to pay higher interest rates, and some receive credit even if they offer to pay lower rates. (b) At a given supply of credit there are identifiable groups who are unable to obtain credit at any interest rate, and would only obtain it if the supply increased (Atieno 2001).

For potential loan applicants in rural areas in many parts of the developing world, the problem is even more complicated. In most cases, there is very little incentive for lenders to extend credit. This has changed over the years with the possibility of credit rationing, though the rationing tends to favour medium and large scale agricultural concerns over smallholders (Burgess and Pande, 2003). Besley (1994), emphasises the need for interventions in rural credit markets due to the prevalence of market failure. Imperfect information makes contract enforcement extremely costly in credit markets. Therefore, defining market failure with reference to the efficiency measure that applies in a perfectly competitive market will be misleading. Besley (1994) found that these two issues of imperfect information and expensive contract enforcement result in credit rationing, adverse selection and moral hazard. There is adverse selection when the market lacks perfect information, as an increase in interest rates causes those borrowers with less risky projects to shy away from debt while those with more risky projects and hence poorer repayment prospects develop a higher appetite for debt. Interest rates thus have an impact on the average quality of the loan portfolios held by lenders as well as equating demand and supply for credit. Lenders set the

interest rates lower than the market equilibrium and proceed to ration access to credit. This credit rationing is largely due to imperfect information in rural credit markets (Besley, 1994). Moral hazard is a result of the fact that projects with identical mean returns will have different risk profiles, and lenders cannot reliably determine how borrowers will behave (Stiglitz and Weiss, 1981; Besley, 1994; Ibtissem and Bouri, 2013). An increase in interest rates reduces the incentive of the borrowers to act in a manner that is conducive to loan repayment, leading to the possibility of credit rationing (Atieno, 2001).

Bell (1990) also demonstrates a relationship between incomplete information, imperfect contract enforcement and the probability of loan default and eventual credit rationing. The conclusion of the study was that loan supply is simultaneously determined with the implicit credit demand function. By impacting transaction costs, risk plays a crucial role in credit allocation in incomplete credit markets (Ibtissem and Bouri, 2013). Accordingly, as risk exists by default in credit markets, with a supply curve that slopes upward, lenders will restrict borrowers to a number of points on the supply curve. The loan demand schedule cannot be identified using the observed loans since these loan amounts reflect only the existing supply. The borrower's decision to participate in the credit market or not, meaning the decision of whether to borrow and from whom to borrow, depends among other things, on the opportunities available and their economic situation (Ledgerwood *et al*; 2013). The credit demand function is interpreted from the participation decision and this demand schedule identification setback therefore suggests the presence of credit rationing (see also Elhiraika and Ahmed, 1998; Atieno, 2001).

Available empirical research on rural credit use suggests that it is difficult to judge the level of potential demand from revealed demand, and to determine whether it outweighs supply (Aryeetey, 1996b). The limited supply due to credit rationing leads to a low revealed demand, suggesting a lack of demand. Market failures create a perception that transaction costs and inflexible contract terms in the credit market far exceed the utility, so rural households prefer to finance working capital with profits from their different activities and also use informal credit markets. Botswana's credit markets are no different from the rest of the developing world, which is why the government made a decision to fund several schemes through the government owned DFIs like NDB and CEDA (MFDP 2010). Initiatives like the Temo Bokamoso Credit Scheme are supposed to solve the supply side issues, increasing available funds for development, especially in those sectors that would traditionally have difficulty in obtaining access to finance. Participation in these schemes however still falls far short of expected levels (NDB 2011).

### **2.2.2 Studies on the characteristics of rural credit markets**

Rural credit markets in the developing world have a couple of additional features that make them rather unique as opposed to the urban financial markets (Conning and Udry, 2007). Understanding these features helps to clarify the context within which schemes like the Temo Bokamoso operate in a bid to service rural smallholders.

#### **2.2.2.1 Fragmented credit markets**

There is fragmentation in rural financial markets, as depending on the characteristics of the different lenders and borrowers, and the types of activities financed, borrowers are spread across diverse loan instruments and lending intermediaries [McKinnon (1973); Hoff, Braverman and



Stiglitz (1993); Meyer, (2015)]. Financial instruments in the same market vary substantially in nature and structure. Interest rates, the type and quantity of collateral, and resources invested on monitoring and enforcing contract terms differ widely from firm to firm (Conning and Udry, 2007). Udry (1991) found large variations in the interest rates charged during a study in northern Nigeria: about 20% of the loans had interest rates that surpassed 7.5%. Ngugi (2001) found spreads in Kenya in the late 1990s ranging between 15% and 30%. Okurut (2011) found that the informal sector in Botswana charges monthly interest rates of 20% to 30%.

In the rural economy there is a wide range of financial intermediaries and moneylenders which include input suppliers, rural product traders, and banks (Conning and Udry, 2007). The following observation was made by Sir Malcolm Darling (1925) about the rural moneylender of Punjab:

“He is always accessible, even at night; dispenses with troublesome formalities, asks no inconvenient questions, advances promptly, and if interest is paid, does not press for repayment of principal. He keeps in close personal touch with his clients, and in many villages shares their occasions of weal or woe. With his intimate knowledge of those around him he is able, without serious risk, to finance those who would otherwise get no loan at all.”

A common form of intermediated finance in rural financial markets is contract farming. A contract farming firm would enter an agreement with a farmer to market or process his harvest and would provide the farmer with farm inputs or credit in exchange. The collateral for the loan would usually just be the expected harvest, which would be pledged. The contract farming firm would have to invest significant resources in monitoring the farm during the growing season to prevent the farmer from diverting resources towards other activities the lender may not have claims to. Mechanisms

exist to motivate the farmer to act in the lender's best interest, like lending only a fraction of the expected value of the crop (Conning and Udry, 2007). The Botswana Agricultural Marketing Board (BAMB) provides contract farming services to farmers. BAMB identifies markets for particular crops and then contracts farmers to produce them at agreed prices and quantities prior to planting (MOA, 2015). The farmers can then use this off-take agreement from BAMB as collateral to participate in the Temo Bokamoso or any other scheme provided by one of the other government owned DFIs. This facilitates access to finance for rural smallholders in Botswana yet the rural markets have been observed to have low participation and be significantly fragmented, with the majority of farmers not taking up the opportunities on offer (Okurut *et al*, 2009).

#### **2.2.2.2 Government interventions in rural credit markets**

Government intervention has been a customary feature of rural financial markets for as long as they have existed. When Hammurabi, ruler of Babylon and ancient Mesopotamia developed one of the earliest codes of law between 1792-1750 B.C, he included many laws intended to regulate the provision of credit to farmers by merchants. One law capped the interest rate on loans of grain to thirty three and one third percent. Other regulations limited borrowers' liability on agricultural debts if they lost their harvest due to drought or other natural disasters (Goetzmann, 1996). When government provides strong impartial legal institutions and mechanisms, contract enforcement and other transaction costs are significantly reduced (Porter *et al*, 2015). Governments in many developing countries also cap interest rates or strengthen and monitor requirements for financial intermediation in order to discourage the practice of usury (Conning and Udry, 2007). Governments have for decades been attempting to stimulate the development of private sector financial intermediation by providing guarantees and loans. The state is still the dominant provider

of institutional finance in most developing countries, and this is particularly evident in Botswana though access varies widely between the regions (BOB 2014).

The World Bank's 1975 Report on agricultural credit found that subsidized lending was available to under 1% of those involved in agriculture in Africa obtained access to subsidized lending. The main reason for the lack of effective intermediation in many developing countries is that government's participation in microfinance often has the effect of crowding out private investment (Conning and Udry, 2007). Although well-intentioned, many government policies intended to develop rural economies tend to discourage private financial intermediaries from entering the sector. Microfinance programmes funded by the state also have a problem of being subverted in order to achieve political aims (Deininger, 2003). During the 80s and 90s, it was found that loans by government funded DFIs in India to rural farmers grew by more than 10 percentage points in election years, with districts where the elections were heavily contested benefitting most, regardless of the potential for productivity or repayment (Cole, 2004). In the 1980s, the International Monetary Fund (IMF) assisted 37 African countries to implement structural adjustment programmes (SAPs) due to the failure of policies that included state intervention schemes in rural financial markets (Noorbakhsh, 1999). The World Bank reduced annual lending for agricultural projects from US\$ 1 billion to under \$250 million in the 1990s (Zeller, 2003). As part of the SAPs, many state owned enterprises were privatized, many state banks were either closed or restructured and rural financial markets were liberalised. These reforms led to new financial intermediaries. Developing country governments are now faced with a major challenge of regulating, supporting and promoting these new rural institutions (Conning and Udry, 2007). The evolution of the institutions that might support a flourishing rural financial sector must be

viewed in the context of incomplete information and imperfect contract enforcement (IFAD, 2011). Botswana ranks highly in most indexes which measure governance and the ease of doing business and contract enforcement like the 2014 Ibrahim Index of African Governance (IIAG) Index and Bank of Botswana's 2014 report acknowledges the wide extent of government intervention in the rural credit markets through various DFIs like NDB.

### **2.3 Microfinance and welfare in theory**

Christen (1997) defines microfinance as 'the means of providing a variety of financial services to the poor based on market-driven and commercial approaches'. This definition considers all possible financial services provided to the poor like savings, credit, money transfers, remittances, insurance and so on, suggesting that it is not the size of the service but the economic class of the client that makes it microfinance (Kiiru, 2007; Ledgerwood *et al*, 2013). Microfinance institutions however mainly focus on the provision of small loans (microcredit) to the poor with the objective of smoothing consumption or financing initiatives to improve their income producing capability and general household welfare (Diagne *et al* 2001). There is a consensus in development policymaking circles that microfinance is an important tool for reducing poverty, so concerted efforts are being made to ensure access to microfinance is provided in a sustainable manner and the poor are encouraged to participate (Okurut *et al*, 2012). This has been met with skepticism in many quarters as some are of the opinion that microfinance has no impact on poverty alleviation. Adam & Von Pische (1992), argued that "debt is not an effective tool for helping most poor people to enhance their economic condition be they operators of small farms or micro entrepreneurs". Their contention is that smallholder farmers have more important problems facing them like access to markets for their produce, land tenure, access to farming technology and product prices. Gulli

(1998) claimed that addressing more pressing constraints like social services and business development tools and training would be more effective in reducing poverty (Meyer, 2015). Mayoux (2002) in a study on access to finance for rural women found that instead of empowering the women, microfinance left them highly indebted with little to show for it due to the fact that they had little control over the funds allocated to them because of the structure of gender relations in their communities (Mayoux 2002; Pooter *et al*, 2015). The literature on microfinance impact in Botswana is very scant and this study should make a relevant contribution to it.

## **2.4 Empirical review of Microfinance impact on welfare**

Measures of prosperity such as social participation, economic participation and wellbeing are an important way to measure the impact of microfinance and other socially responsible financial programs (Corrie 2011). ‘Impact’ is the incremental result due to an intervention, while ‘welfare’ is the well-being of the subject of the intervention (Bauchet *et al.*, 2011). Hulme (2000) argued that impact assessment is best determined from the perspective of an individual, household, enterprise or community level. Okurut *et al* (2012) demonstrated that the reason studies on impact produced such divergent results was due to different methodologies, impact metrics and failure to control sampling bias. Duvendack *et al* (2011) suggested that the main limitations of studies on impact of microfinance is data inadequacy and Kabeer (2001) in a discussion of impact studies on women empowerment found that divergent results were due to a poor understanding of power relations in the sampled households. Hulme and Mosley (1997)’s study in seven countries in Africa and Asia, reported a significant positive effect on house hold welfare. Okurut *et al* (2013) also reported a significant positive impact on gender empowerment in Botswana. Binswanger and Khandker (1995) found that access to credit enabled rural households to smooth their consumption

during leaner periods of the year. Multiple studies on the Grameen Bank hailed the bank as promoting the empowerment of the poor, especially women (Hossain 1988). The Bangladesh Institute of Development Studies also conducted joint studies with the World Bank which established causal relationships between access to micro-finance and poverty alleviation in Bangladesh (Pitt and Khandker 1998). These studies also found that micro-finance schemes improved the healthcare of the participants and led to other social benefits like education for the children as households invested the incremental incomes in other aspects of their wellbeing. A study by Johanna (2013) on the impact that microfinance has on the empowerment of rural women in Burma found a significantly positive impact at the one percent significance level. Chowdhury *et al.* (1991), noted that their treatment group of women had acquired more assets and earned more income than the group of nonparticipants in the microfinance scheme in Bangladesh. Coping mechanisms developed by the participants to manage lean periods were also more effective than those of the nonparticipants in the Chowdhury *et al* (1991) study.

Several studies in the developing world have posted contrary findings on the impact of microfinance on rural welfare. Okurut and Bategeka (2006), did not find a significantly positive effect on households sampled in Ugandan villages. Coleman (1999), performed a nationwide survey in Thailand and reported that the female respondents in the study had not experienced a significant improvement in their asset holdings or incomes. The finance provided to these women had ended up being consumed to meet day to day expenses, leaving the women in a vicious cycle of debt as they had to turn to moneylenders who charged exorbitant rates in order to settle the initial credit. The village bank loan scheme had then collapsed. Coleman (1999) thus concluded that microfinance is not an effective tool for transforming the wellbeing of the rural poor. Diagne

and Zeller (2001) were also notable critics of the use of microfinance for poverty alleviation as their study found its effect to be counterproductive. Burger (1989) observed that the income of the participants did not increase and no new jobs were created. Access to microfinance left the community right where it had started off. Goetz and Gupta (1994) found that a microfinance scheme targeted at women failed to empower them because of the balance of gender power in the community. While the women went out and took the loan commitments, the funds disbursed were then turned over to their husbands for investment decision making. The women were then saddled with the responsibility of repaying the loan obligations and suffered domestic violence if they tried to turn over this responsibility to the men who had squandered the funds. Montgomery (1996) and Ackerly (1995) echoed the same views about women having little control over their loans and having to work additional jobs in order to pay them off. Banerjee *et al* (2013), did not find significant differences in consumption expenditure or in the profitability of financed ventures between the treatment and control groups in India. They concluded that the microfinance scheme had not had the desired effect.

It is clear from the above empirical review that the evidence currently available on the impact of microfinance on the welfare of those rural poor who have access to it is very mixed. However, there is very little empirical work that has been conducted within the socio-economic context of Botswana and hopefully this study will make a contribution and provide some insight on the impact of schemes like NDB's Temo Bokamoso on the country's rural poor.

## **2.5 Botswana's financial sector**

The Central bank, Bank of Botswana (BOB), is the regulator of the banking industry in the country. It has regulatory authority over the commercial banks, bureau de changes, deposit-taking microfinance institutions as well as statutory banks (BOB, 2015). According to Bank of Botswana's Annual Supervision Annual Report 2014, the industry is one of the fastest growing in the country, accounting for about 8% of GDP. There are 11 commercial banks which dominate the industry with total assets and liabilities at the end of 2014 of about 48% of GDP (BOB, 2015). Besides the commercial banks, there is a merchant bank and a number of government-owned financial institutions, including Botswana Savings Bank (BSB), the National Development Bank (NDB), CEDA, and the Botswana Development Corporation (BDC) (eConsult, 2015). These control 10% of the banking industry assets and liabilities as opposed to 90% for the commercial banks (BOB, 2015). There is also the partially government owned Botswana Building Society (BBS). Private micro lending companies like Letshego, Penrich, First Funding, and Peo (which are quite large), and a large number of small, informal entities ("cash loans") dominate the microfinance space, with competition from a number of unlicensed credit unions, savings and loans societies (metshelo) and burial societies. Since they do not take deposits, they are not subject to banking regulation so it is difficult to obtain information on their activities (eConsult, 2015). Most of these microfinance institutions however focus their activities in the urban areas where they provide payday loans and other forms of credit to small businesses and entrepreneurs. Penetration in the rural areas is 25% lower than the average for African countries (BOB 2015).

The BDC deals with commercial loans starting at P30 million (USD3 million) to large-scale enterprises; CEDA provides long term finance to citizen owned entrepreneurial ventures as its



mandate is to develop local entrepreneurship; BBS provides mortgage finance to commercial entities and full time employees. Credit unions and metshelo provide small-scale savings facility, and burial societies provide savings and insurance services, though the interest rates are not attractive (eConsult, 2015). There are two schemes available for smallholder farmers, the NDB's Temo Bokamoso Scheme and CEDA's Young Farmers' Fund.

The banking industry in Botswana is extremely profitable, due to its oligopolistic nature leading to high banking charges and access issues. The return of equity enjoyed by the industry is over 20% (BOB, 2015). This is in keeping with the rest of the African continent where returns on assets and equity are generally high by world standards (eConsult, 2015). The high returns cannot be explained by the level of risk, as BOB (2015) reports that the default rates are low and the industry performs better than most countries in credit and other financial risk assessments. It is thus clear that the level of competition is inadequate. The population may be small but it is quite a prosperous country and the high profitability and lack of competition may be the reason why lenders do not bother to penetrate the market for credit to rural smallholders, forcing the government to step in with schemes like the Temo Bokamoso.

## **2.6 Conclusion**

Papias and Ganesan (2010) identified three main forms of credit constraints which prevailed among the majority of the rural households they studied. The first one was quantity rationing, with finance houses limiting the amount of credit they were willing to extend; the second was risk rationing, with financial institutions reluctant to accept the risk of financing certain activities; and the third being self-imposed constraints, as smallholder farmers often chose to self-select

themselves out of formal financial markets due to factors intrinsic either to their households or to their farms. (Baydas *et al.* 1994; Binswanger *et al.* 1989; Diagne 1999; Diagne *et al.* 2001; Fuentes 1996; Hashemi *et al.* 1997; Kiiza and Pederson 2001; Oboh and Kushwaha 2009; Okurut *et al.* 2013; Muhongayire *et al.* 2013). It is thus pertinent to determine what specific institutional, socio-economic and activity factors determine participation in micro finance schemes in Botswana. While multiple studies have investigated the determinants of participation in microfinance for rural populations (Alexander-Tedeschi and Karlan. 2006; Heckman, J. and J. Smith. 2004), they have mostly focused on gender empowerment and none have been conducted on any specific credit lender to smallholder farmers in Botswana specifically. Identifying the factors that affect participation in credit schemes in Botswana would provide valuable insights for rural development policy makers and other stakeholders. In conclusion, empirical evidence on the determinants and impact of microfinance on the welfare of the beneficiaries in the studies reviewed is at best mixed, increasing the relevance of the current study.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

The previous chapter provides the foundation upon which the determinants of credit use by smallholder farmers can be identified. This chapter identifies some key variables that affect the probability of participation in the Temo Bokamoso credit scheme in Kweneng District of Botswana by allowing the formulation of an econometric model for this study. The first section discusses the conceptual framework from which variables to be used in the model will be identified. This is followed by an outline of the methodology for data collection, sample design and sample techniques that have been employed in the study. The last sections specify the econometric model that have been adopted and conclude the chapter.

### **3.2. The Conceptual Framework**

#### **3.2.1. Socio-Economic Features of the Farmer and Credit Participation**

Over the last 40 years agriculture in Africa has evolved significant, moving slowly away from being a subsistence industry to a viable industry with high returns, which is the backbone of many African economies. The Alliance for a Green Revolution in Africa (AGRA) released a 2014 Africa Agriculture Status Report which noted that smallholder farmers account for 80% of the agricultural activity in Sub-Saharan Africa, employing about 175 million people. With environmental issues like climate change and increasing competitiveness fast gaining prominence, increasing returns in agriculture is dependent on farmers' abilities and skills, adoption of new technologies and access to credit markets (Arene 1992; Njoku and Odii 1991). The impact of gender on access to and

participation in rural finance cannot be ignored as women make up 70% of smallholders (AGRA, 2014). Baydas *et al.* (1994) found evidence of discrimination against women in formal financial markets, a view echoed by several other researchers. Buvinic *et al.* (1979) identified lack of control over their economic resources and the nature of the activity women engage in (mostly farming), as major factors hindering their access to formal credit compared to men. Mohamed (2003) in gathered empirical evidence in Zanzibar that supports these assertions.

Age is another factor that can have a significant impact on farmers' ability to access financial markets. Older people are likely to have more farming experience and have had more time to acquire collateral, factors which increase the trust and confidence of lenders but also lessen their reliance on credit (Feder *et al.* 1988). On the other hand, younger farmers may not have much of a track record to demonstrate their farming competence, or significant assets to use as collateral, but need credit to be able to adopt new technologies and maximise their farming output (Nguyen 2003). This leads to a paradox in rural credit markets wherein older people who are considered more creditworthy participate less, due to being more risk averse and having less need for credit, while younger farmers who rely on credit for their survival and growth are discriminated against. In Pakistan, Shah *et al.* (2008) found that participation in credit was significantly influenced by the age of the borrowing household head.

Feder *et al.* (1988), concluded that education is an asset which improves not only the farmer's efficiency, but also their understanding of credit markets, increasing the likelihood of participation. As a rural household acquires more formal education, their improved financial management skills and exposure to information on how to improve their operational efficiency helps to secure access

to finance (Musebe *et al.* 1993). A study in rural Kenya by Musyimi (2010) on the determinants of credit market participation found that the majority of farmers did not participate due to ignorance on the modalities of accessing and managing credit. Studies in China, Pakistan, Uganda and Zanzibar all found a strong positive correlation between the level of education achieved by the farmer and the probability of participating on a credit scheme (Kiiza and Pederson, 2001; Mohamed, 2003; Shah *et al.*, 2008; Tang *et al.*, 2010). The size of the household is indicative of the amount of labour available for economic endeavours. A household with a sizable labour force is likely to be a lower credit risk since the burden of productivity is spread over a larger number of people (Schereiner and Nagarajan 1997). Empirical evidence has been documented in China, Pakistan and notably in Ethiopia on the impact of the household size on rural participation in credit schemes (Tang *et al.* 2010, Shah *et al.* 2008, Sisay, 2008).

Income from non-farming activities is another important determinant of credit market participation. However its effect can either be positive or negative depending on the circumstances. Off-farm income sources can be used as collateral and the incomes can also help to finance repayments, so it reduces the risk profile of the borrower and provides reassurance to the lender (Sharma and Zeller 1997). Diagne (1999), found that having income from non-farming activities improves a farmer's access to credit. On the other hand, income from non-farming activities has also been found to reduce the level of participation in credit schemes as it enables households to finance their activities without having to resort to debt. Studies in Uganda, Nigeria and China found that households with incomes from sources other than farming had a higher probability of participating in microfinance schemes (Kiiza and Pederson, 2001; Oboh and Kushwaha, 2009; Tang *et al.*, 2010).

### **3.2.2. Farm Characteristics and Credit Market Participation**

Agricultural land is usually the most valuable asset of the rural farmer, and the main collateral for credit (Binswanger and Rosenzweig 1986). Farmers with bigger landholdings are also more likely to participate in the credit market as capital would be required to fully exploit the land. The size of the landholding is thus expected to have a positive correlation with the likelihood of participation in credit. Oboh and Kushwaha (2009) in Nigeria, and Tang *et al.* (2010) in China obtained empirical evidence that credit demand is significantly influenced certain farm features like the size of the farm, availability of irrigation and the type of farming activity carried out.

### **3.2.3. Institutional Characteristics**

The role that local institutions have to play in farmers' access to financial markets has been highlighted by several studies. The levels of penetration of financial institutions in a rural area would have an impact on the ability of the local population to participate in formal credit. Kiiza and Pederson (2001) in Uganda, Oboh and Kushwaha (2009) in Nigeria, and Shah *et al.* (2008) in Pakistan and Sisay (2008) all found that physical proximity to credit providers is a significant factor in a rural household's decision to participate in credit programmes.

## **3.3 Study area**

Kweneng is the homeland of the Bakwena tribe and one of the 11 administrative districts of the Republic of Botswana. The Bakwena derive their name from their totem, the crocodile (kwena), and the district is home to the Kobokwe Caves in which legend says Bakwena Kings used to throw

in witches before their conversion to Christianity by famed missionary David Livingstone. It is a semi-arid region like most of Botswana and has various historical landmarks. The seat of the district's government is Molepolole, Botswana's most populous village and the district is strongly affected by rural-urban migration because of its proximity to Gaborone. There are 6 villages in the district with a total population of 176,373 as per the last census in 2011. It is a fully rural district as there are no towns, one of the features that make it very suitable for this study.

**Table 3.1 Population of Kweneng district**

Village	Population		
	2001	2006	2011
Molepolole		65,570	67,598
Mogoditshane	14,246	46,493	57,637
Thamaga		21,141	19,547
Gabane	10,399	13,581	14,842
Kopong	5,571	7,999	9,520
Letlhakeng	6,032		7,229

Source: Statistics Botswana 2011 census

### **3.3.1. Economy of Kweneng district**

The main economic activity in the villages of Kweneng district is agriculture. The two biggest villages are mostly inhabited by people who work in the national capital, Gaborone, as they are very close to the capital and the city has been expanding in that direction. About 90% of the population of the other villages is engaged in mixed farming and the rest 10% is engaged in petty trading, hospitality industry, government officials, daily labourers, artisans etc. The farming practices in the district can be characterized as mixed, and includes the production of arable crops and raising of livestock, including cattle, goats, chicken and small ruminants. The output of both sectors has been depressed for a number of years due to an extended drought and erratic rainfall.

### **3.4 Research Design**

The study adopted a descriptive survey design, with the intention of depicting the participants in the most accurate way possible. The descriptive survey design makes it possible to narrow down the research problem and investigate it with precision (Wilkinson and Bhandarkar, 1986; Kothari, 2006). The use of a survey was appropriate because it enabled the identification of patterns that applied generally to the sample as indicated by Saunders *et al*, (2009). Consequently, results of the study go a long way towards explaining to what extent participation in the Temo Bokamoso Credit Scheme in Kweneng district is influenced by certain internal and external factors. The research design also provided a built-in flexibility that transformed the research problem to one with more precise meaning.

### **3.5. Sampling Procedure and Data Collection**

The study used a multistage sampling procedure to select farm households. Kweneng district was selected purposely out of the total 11 districts of Botswana based on its high agro-ecological potential. The district is also largely rural, but due to a higher population density than the other rural districts, the farming activity is mainly carried on by smallholder farmers (Statistics Botswana 2014). Its closeness to Gaborone where the researcher is based was also a factor due to cost considerations. From its six villages, Thamaga, Gabane, Kopong and Letlhakeng were purposefully selected based on their largely rural character and the high participation in formal credit, made possible by the closeness to Gaborone where NDB and the other finance houses are based. One ward was then randomly selected in each of these identified villages. The Headmen for these wards assisted with a list of the resident households and that amounted to the sample frame. Furthermore, a list of the clients who participated in the Temo-Bokamoso project and who



are resident in the selected wards was then obtained from NDB. This constituted the treatment group whereas the non-clients acted as the control group.

The NDB list provided up to 56 households from the chosen wards that participated in the scheme. A structured questionnaire was prepared to collect data for the study using face-to-face interviews. A pilot test of the survey instrument was conducted, which allowed the researcher to adjust the forms and flows of questions. Afterwards, face to face interviews were performed with the 56 credit scheme participants and 56 non participants. Only the household heads were allowed to participate in the interviews.

### **3.6. Econometric model: logistic regression**

An econometric approach was employed to assess the factors that determine rural farmers' participation in the microfinance scheme. However, a statistical analysis was utilized to assess the impact on their welfare. In the econometric approach, the independent variables are denoted as dummy and then multiple regression analysis is carried out. Linear regression is significantly more complex when the dependent variable is binary (Pindyck and Rubinfeld, 1981). A binary model assumes survey participants have two mutually exclusive options, for instance, to participate or not to participate in a credit scheme. Descriptive statistics were employed to discuss the sample, using measures of central tendency like mean, median and mode and measures of dispersion like the standard deviation, variance and skewness. The results were also summarized using ratios, percentages, and tables. The determinants of participation in the TBCS were then identified with the help of a logistic distribution (*logit*) model and a logistic regression showed the functional relationship the determinants have with the decision to participate.

Hosmer and Lemeshow (1989), demonstrated the superiority of the logit model over others. They showed that from a mathematical perspective its use easier, and more meaningful results are produced when it is used to analyse dichotomous variables. This is very relevant as this study set out to analyse which of the independent variables influence the dependent variable, and the strength and nature of this influence. Some of the independent variables are dummy while others are continuous. The dependent variables on the other hand are dummy and take a value of zero or one based on whether or not a farmer participates in the Temo Bokamoso Credit Scheme and their participation has led to an improvement in their welfare. According to Gujarati (1995), the types of models most commonly used to evaluate the factors that determine micro-finance participation are logit and probability + unit (probit) models, when dealing with a limited number of dependent variables. When doing a regression using a probit model, the dependent variable can also only take one of two values, for instance, married or not married. The probit model produces results that are very similar to those of a regression performed with a logit model. However, the logit model is easier to estimate and the results are easier to interpret, leading to it being more widely used in such studies (Green, 2011). This study employed the binary logit model for these reasons.

### **3.7. Model specification**

The logit model employed for studying the determinants of participation in the Temo Bokamoso Credit Scheme in Kweneng district and its impact on the welfare of participants can be specified based on the contributions of Green (2011) and Gujarati (1995). The explanatory variables included dummy and continuous variables as outlined below, while the dependent variable a dummy variable, taking a value 0 or 1 based on whether or not an individual is participating, and

whether the participation has an effect on their income. Logistic regression does not assume a linear relationship between the dependent variable and independent variables, but requires that the independent variables be linearly related to the logit of the dependent variable (Green, 2011). Pundo and Fraser (2006) explained that the model allows for the interpretation of the logit weights for the variables in the same way as in linear regression. Accordingly, consistent estimation is possible by conditional maximum likelihood, such that the standard logistic distribution is therefore given as:

$$P(\text{Participation}_i) = \frac{e^{\alpha_i + \beta_1 \text{Sex} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Educ} + \beta_5 \text{Ned} + \beta_6 \text{Pexcr} + \beta_7 \text{rpgc} + \beta_8 \text{Ainf} + \beta_9 \text{Dist} + \beta_{10} \text{Irrig} + \beta_{11} \text{Tlh}}}{1 + e^{\alpha_i + \beta_1 \text{Sex} + \beta_2 \text{Age} + \beta_3 \text{Gender} + \beta_4 \text{Educ} + \beta_5 \text{Ned} + \beta_6 \text{Pexcr} + \beta_7 \text{rpgc} + \beta_8 \text{Ainf} + \beta_9 \text{Dist} + \beta_{10} \text{Irrig} + \beta_{11} \text{Tlh}}}$$

Where,  $P(\text{Participation}_i)$  is probability of participation of individual  $i$ . The right hand side indicates a set of the independent variables all summarized in Table 3.2.

There are many discrete choice models that exist and many have been applied to different economic problems (McFadden, 1981; Baltag, 2005; Green, 2011). The logistic model is counted amongst the best, as it is simple, easily estimated and interpreted. It provides cross elasticities and the software packages applicable to this model are readily available. The package used in this study is Home-Stata version 11. Despite all its merits, a logistic distribution has a problem which is the well-known one of independence of irrelevant alternatives (IIA); which assumes that the utility of choice option is independent of the attributes of other alternatives of the choice. This has led to the development of other models like the probit model which is free from this problem but is conceptually a bit complex to interpret and compute (Baltag, 2005).

### **3.8 Definitions of variables**

#### **3.8.1 Dependent variable**

The dependent variable for the regression analysis represents the observed status of the respondent with regards to participation in the TBCS. In the logit model it takes a value of 1 for participant and 0 for non-participant as it is binary in nature.

#### **3.8.2 Independent variables**

Based on the conceptual framework for the study explained in section 3.1 above, these are a number of demographic and socio economic variables that are hypothesized to influence whether a respondent participates in the microfinance programme. These factors are grouped into three main categories namely the farmer's socio-economic background, the farm characteristics and institutional factors. These are summarized in Table 3.2.

**Table 3.2 Summary of the variables**

No.	Variables	Variable type	Code of the variable	Definition
<i>Dependent Variables</i>				
	MF Participation	Dummy	PART	1=if participated, 0=Did not participate
<i>Explanatory variables</i>				
<i>Farmer characteristics</i>				
1	Age of the respondent	Continuous	Age	Age of the farmer in Years
2	Gender of the household head	Dummy	Hhhead	1=female. 0=otherwise
3	Respondents level of education	Continuous	Educ	1= Never went to school, 2= attended primary school, 3= junior secondary school, 4= senior secondary school, 5=tertiary education institution.
4	Number of dependents	Continuous	Ned	Number of people whose age is below 14 and above 64
5	Previous credit use-experience	Dummy	Pexcr	experience=1,0= no experience
6	Household size	Continuous	Hhsize	Number of people living in the household (sharing food and shelter)
7	Respondents perception of group collateral	dummy	Rpgc	1=appropriate,0=not appropriate
8	Annual income from non-farming activities	Dummy	AINF	1 = the head of household earns incomes from outside the farm; 0= otherwise
<i>Farm Characteristics</i>				
9	Size of Total landholding	Continuous	TLH	The total size of farmer's landholding in acres
10	Farm records keeping	Dummy	FRC	1 = the farmer keeps records of his farming activities; 0=Otherwise
11	Value of available assets	Continuous	VAC	Value of assets in pula
12	Access to irrigation	Dummy	IRRIG	1=have access,0= no access
<i>Institutional Factors</i>				
13	Access to other sources of credit besides TBSC	Dummy	ScoTBSC	1=yes, 0=no
14	Distance from microfinance institution	Continuous	Dist	Distance in kms

### 3.9 Conclusion

Discussions in this chapter focused on the research methodology adopted for the study. A logit econometric model has been specified and the variables for which data was collected also discussed. Also, the chapter has shown that the research is mainly based on primary data collected by administering questionnaires to the chosen respondents. The research design and sampling techniques used in the research were elucidated. The following chapter reports the results that were obtained from the econometric model. A complete analysis of the reported results then follows.

## CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSIONS

### 4.1 Introduction

The results of the study will be discussed in this section, with an analysis of each of the research objectives using descriptive statistics and the econometric regression model output. The Logit model is used to analyse the factors determining participation in the TBCS in Kweneng district while the demographic characteristics of respondents is analysed with descriptive statistics.

### 4.2. Socio demographic characteristics of respondents

#### 4.2.1 Respondent Age

One hundred and twelve (112) respondents, fifty-six (56) participants and fifty-six (56) non-participants, were interviewed. The age range was 26 to 64 years. The (31 to 40) age group had the highest frequency with twenty-four percent (24%) of participants and nineteen percent (19%) of nonparticipants, followed by (41 to 50) with twelve percent (12%) of both groups as seen from table 4.1 below, which shows a positively skewed distribution. Fifteen percent (15%) of participants were over fifty (50), compared to only seven (7) percent of nonparticipants.

**Table 4.1 Age group of the respondents**

Age group	Participant (%)	Non –participant (%)	Total (%)
20-30	3.6	8.0	11.6
31-40	24.1	18.8	42.9
41-50	11.6	11.6	23.2
51-60	11.6	7.1	18.7
60 and above	3.6	0	3.6
Total	100	100	100

#### 4.2.2 Educational status of the respondents

Several studies, notably Khandker (1998) had found a strong positive relationship between the level of education and participation in microfinance so the results were expected to support this relationship. However it was found that both the control and the treatment group were significantly well educated. With respect to educational level of household heads, the majority of household heads (74 %) had tertiary education followed by junior secondary certificate (13%). Among the microfinance clients, the majority of household heads had tertiary education (39%), followed by junior secondary education (9 %). For the non-clients, the majority of household heads had attained tertiary qualification (35 %) followed by junior secondary level (20 %). In conclusion, the results suggest that there was high prevalence for tertiary and junior secondary qualifications amongst the household heads for both microfinance clients and non-clients. This high rural literacy rate is due to the Botswana government financing education up to tertiary level for citizens (DTEF, 2015).

**Table 4.2 Sample Respondents Level of education**

	Microfinance Status		
<i>Education level</i>	<i>Participants (n=56)</i>	<i>Non-Participants (n=56)</i>	<i>Total (n=112)</i>
Primary	0	0.9	0.9
Junior secondary	8.9	19.6	28.5
Senior secondary	5.4	2.7	8.1
Tertiary	39.3	34.8	74.1
<b>Total</b>			100.0

### **4.3 Respondents socio-economic characteristics and farm characteristic**

#### **4.3.1 Total land holding of respondents**

Land is a key asset and source of income in Kweneng district. Participants were found to hold on average eight (8) hectares of land while for nonparticipants the average was five (5) hectares. The respondents land holding ranged from a minimum of two (2) to a maximum of ten (10) hectares. The survey purposefully targeted smallholders with farms of less than 10 hectares. Participants have on average, an area of land three (3) hectares larger than that held by non-participants, suggesting they could have a higher need for finance or just better collateral.

#### **4.3.2 Cash value of respondents' livestock**

From a socio cultural perspective, livestock is the most significant measure of wealth and prestige to the Bakwena community. Ownership of a herd of cattle is even more important than land ownership. The smallholders of Kweneng district practice mixed farming and all respondents admitted to rearing livestock, including cattle, goats, poultry, donkeys and small ruminants. The current market value of participants' livestock was estimated at thirty six thousand, three hundred and forty five (36345) pula while for non-participants it is twenty eight thousand four hundred and seventy three (28473) pula. On getting the loan, participants often acquire livestock to utilize the farm area they are not yet ready to plough in order to generate income from breeding and selling.

#### **4.3.3 Cash value of respondents' other assets**

Other assets held by respondents other than the farm and livestock are potentially collateral for the loan taken from the TBCS. The assets considered here included items like vehicles, farm



equipment, furniture and fittings. On average participants reported assets of twenty nine thousand three hundred and twenty three (29343) pula against twenty eight thousand two hundred and fifty seven (28257) pula for non-participants. While the asset values of participants is higher than that of nonparticipants, the difference does not seem significant enough to indicate that it is a factor in the likelihood of participation in the NDB's Temo Bokamoso Credit Scheme for Kweneng farmers. The asset values for respondents in the study ranged from four thousand (4000) to three hundred and seventy eight thousand, two hundred and fifty (378250) pula.

#### **4.3.4 Respondents number of dependents**

The participants in the Temo Bokamoso Credit Scheme reported having an average of six (6) dependents in their households while nonparticipants have an average of five (5). Dependents are defined as household members whose ages are below 14 or above 64. The mean difference between the two groups is (1.08). The higher level of responsibility due to dependents could possibly be a factor influencing participation in the credit scheme.

#### **4.3.5 Distance from microfinance institutions**

The mean distance from their farms to NDB's nearest branch in Gaborone is forty one (41) km for participants and fifty four (54) km for non-participants. The minimum distance was noted to be ten (10) km while the maximum distance from the residence of respondents is seventy (70) km. The results indicate that respondents who are closer to the institution are more likely to participate in the credit scheme. It is worthy of note that NDB has four branches in Gaborone, Francistown, Palapye and Maun, the four biggest towns, and none in the rural districts.

**Table 4.3: Summary of descriptive statistics (continuous variables)**

Variables	Participants		Non-Participants		Total		Min	Max
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev		
<i>Farmer characteristic</i>								
Age of the respondent	45.75	9.848396	38	7.476022	41.85714	9.520823	26	64
Respondents' level of education	4.535714	0.785419	4.660714	0.720525	4.598214	0.75289	2	5
Number of dependents	5.964286	1.788491	4.875	2.320364	5.419643	2.133552	1	12
<i>Farm Characteristics</i>								
Size of Total landholding	8.196429	1.901384	5.089286	1.729706	6.723214	2.39071	2	11
Value of available assets	29343.21	16370.55	28257.43	32458.86	28955.88	23693.24	4000	378250
<i>Institutional Factors</i>								
Distance from microfinance institution	41.28571	15.88761	54.48214	15.87533	47.88393	14.63166	10	70

From the survey results in Table 4.4 below, seventeen percent (17%) of the participants and thirty-three percent (33%) of the nonparticipants are female heads of households. Forty-three percent (43%) of all participants and fifty-three percent (53%) of non-participants have borrowed from sources of credit other than TBCS. This indicates significant access to other sources of credit including ROSCAs, moneylenders, friends and relatives. Several studies including Maghir (1991) and Sisay (2008) strongly advocate the delivery of financial services through formal regulated institutions as a poverty alleviation measure. This is argued to be especially beneficial to rural women as they then do not need to borrow from informal money lenders with high interest rates. Prior experience of credit use improves participation due to the familiarity with the benefits and the rules and regulations. Table 4.4 below indicates that fifty five percent (55%) of respondents have prior experience. Thirty eight percent (38%) of participants have prior experience with credit use while only eighteen percent (18%) of non-participants do. Previous participation in credit therefore is likely to increase the probability of participating in the TBCS.

**Table 4.4 Selected socio economic and institutional discrete variables**

Variable	Participant (%)	Non-participant (%)	Chi <sup>2</sup>	Total (%)
<b>Farmer characteristics</b>				
<i>Gender of the household head</i>			0.3564	
Otherwise	33.04	16.96		50
Female	16.96	33.04		50
<i>Previous experience of credit use</i>			1.1706	
No	14.29	30.36		44.65
Yes	37.5	17.85		55.35
<i>Respondents perception of group collateral</i>			51.65	
Appropriate	28.57	1.79		30.36
Not appropriate	21.43	48.21		69.64
<b>Farm Characteristics</b>				
<i>Access to irrigation</i>			1.94	
No	77	69.38		71.84
Yes	23	30.62		28.16
<b>Institutional Factors</b>				
<i>Access to other sources of credit besides TBSC</i>			2.6868	
No	47	56.94		53.72
Yes	53	43.96		46.28

Improving rural welfare is vital for reducing urban migration and reducing poverty in general. It is also important for empowering women, who play a vital role in the Kweneng rural economy.

#### **4.3.6 Income from non-farming activities**

About ninety one (91%) of the TBCS participants reported that they had alternative sources of income besides their agricultural activities. Table 4.5 indicates that nine percent (9%) of participants and twenty nine percent (29%) of nonparticipants earn below five thousand (5000) pula. At the other end of the table, while thirteen percent (13%) of participants earn over twenty five thousand (25000) pula, there are no nonparticipants in this income group. Farmers are aware that having an alternative source of income improves lender confidence so it motivates them to seek credit.

**Table 4.5 Annual income from non-farming activities**

Annual income from off farm	Participant (%)	Nonparticipant (%)	Total (%)
<5000	8.9	28.6	18.8
5001-8000	21.4	19.6	20.5
8001-11000	17.9	17.9	17.9
11001-14000	10.7	8.9	9.8
14001-17000	16.1	12.5	14.3
17001-20000	7.1	7.1	7.1
20001-25000	5.4	5.4	5.4
Above 25000	12.5	0	6.3

#### 4.3.7 Pattern of overall income- a welfare analysis

Fifty two percent (52%) of participants reported an improvement in their incomes in the period since joining the Temo Bokamoso Credit Scheme while only thirty four percent (34%) of nonparticipants reported an increase in income over the corresponding period. The difference in incomes is in favour of those who participated in the scheme. The increase in disposable incomes were generally acknowledged to have enabled improvements in household welfare, by financing children's education, better healthcare and other social amenities. Thirty one percent of participants reported a decrease in their incomes while forty one percent (41%) of nonparticipants claimed their income had reduced. It is pretty evident that TBCS participants in Kweneng district have fared better than those who did not participate in the programme. However, it is worth noting that of those whose fortunes were negative, eleven percent (11%) of participants declared that their income had reduced greatly as opposed to only three (3%) for nonparticipants. This is indicative of the fact though credit participation is generally beneficial, in those instances where the loan is not employed properly or the venture financed fails, it leads to more hardship.

**Table 4.6 pattern of household income**

Household income in last 5yrs	Participants (%)	Non-participants (%)	Total (%)
Increase greatly	5.6	5.4	5.5
Increased	46.4	28.3	37.4
Stayed the same	16.7	25.8	21.3
Decreased	19.9	37.5	28.7
Decreased greatly	11.4	3.0	7.2

## **4.4 Econometric result analysis**

### **4.4.1 Diagnostic tests**

The overall significance of the model has been tested using the LR statistic, which tests the joint null hypothesis that all slope coefficients except the constant are zero. The Chi squared statistic of 110.07 shown in Table 4.7 is high enough to reject the null hypothesis and conclude that the model's goodness of fit is acceptable at 1 percent as also indicated by the probability value for LR statistic (0.0000). The likelihood index ratio, McFadden's R-squared, is sufficiently high to suggest a strong relationship of the explanatory variables with the dependent discrete variable. McFadden's Pseudo R-squared mimics the traditional OLS R-squared, but should be lower than that of the linear regression. As a rule of thumb, a value less than 0.2 indicates a weak relationship, between 0.2 and 0.4 represents a moderate relationship, and above 0.4 is generally accepted as a strong relationship. The Pseudo R-squared has been reported as 0.7096, which confirms a strong explanatory relationship of the independent variables with the dependent variable.

#### 4.4.2 Results of the logit model

The results of the logit model, the maximum likelihood estimation, indicates that some of the explanatory variables included in the econometric model have a significant influence on the probability of participation in TBSC. These are grouped under the farmer's socio-economic characteristics, farm characteristics and the bank's institutional characteristics, presented in Table 4.7 and discussed below.

**Table (4.7): Logit model's maximum likelihood estimates on dependent variable (PART)**

Variables	Estimated coefficients	Odds ratio	Z	Z> /P/
<b>Farmer characteristics</b>				
Age of the respondent (age)	0.2108542	1.234732	2.50	0.012
Gender of the household head (sex)	0.7863108	2.195283	0.91	0.362
Respondents' level of education (educ)	0.8262782	2.284799	1.07	0.285
Respondents perception of group collateral (rpge)	4.557811	95.37446	2.91	0.004
Number of dependents (ndep)	0.3394774	1.404214	1.12	0.264
Previous experience of credit use (pexcr)	1.138913	3.12337	1.71	0.088
Annual income from non-farming activities (ainf)	-0.4389707	0.6446997	-0.35	0.726
<b>Farm characteristics</b>				
Access to irrigation (irrig)	3.282829	26.65105	2.63	0.008
Total size of landholding (tlh)	1.181242	3.258417	3.22	0.001
<b>Institutional Factors</b>				
Distance from microfinance institution (dist)	-0.0624369	0.9394723	-1.86	0.063
Number of obs. =112      Likelihood Ratio Chi2(10) = 110.07      Prob>Chi2 =0.0000      Pseudo R2 = 0.7096				

#### 4.4.3 Explanation of significant independent variables- (Farmer characteristic)

An interpretation for the explanatory variables that were found to be significant as per the above logit model results is provided below:

**4.4.3.1 Age (age):** The theory discussed in chapter two has postulated a positive relationship between age and access to microfinance credit. Results of the model have supported this

postulation with a 5% level of statistical significance. Thus, the probability of participating in the TBSC increases by a factor of 1.234732 as the age of potential clients increases by a year. The same relationship was obtained by Shah et al. (2008) on Pakistan as they concluded that the older the household head the greater the chance of participation in a credit scheme. The rationale is that older age is likely to be commensurate with more experience in the farming field and hence, increases trust and confidence of the lenders.

**4.4.3.2 Prior experience with credit use (*pexcr*):** The output of the logit model indicates that prior experience of credit use has a positive effect on the probability of participation, at a 10% level of significance. The odds ratio shows that those who had previously been involved in a formal credit scheme were much more likely to participate. A one unit increase in prior experience with credit leads to an increase of 3.12337 in the probability of participation. This is due to the fact that those with prior experience are acquainted with the benefits of microfinance and are more informed about the rules and regulations. Atieno (2001), obtained similar results in Kenya, indicating that any kind of experience, whether with formal or informal credit markets is likely to impact positively on participation.

**4.4.3.3 Respondents' perception of group lending (*rpgc*):** the results show that this variable positively impacted on participation in the programme at 1% level of statistical significance. The odds ratio is in support of participation as indicated by a high factor of 95.37446. Dufhues and Buchenreider (2005) suggested that group lending in rural markets helps to improve access to credit better than individual, because of the cohesive nature of rural societies. The positive and

significant impact of the respondents' perception towards group lending on participation therefore upholds this assertion.

#### **4.4.4 Non-statistically significant variables for the farmer's characteristic**

**4.4.4.1 Gender (sex):** This dummy variable took 1 if the respondent was a female and 0 if male. The variable weakly and positively influences participation with the odds ratio of 2.195283. The result contradicts the negative hypothesis depicted by Baydas *et al.* (1994) that women are discriminated against in formal financial markets. The result rather implies that being a female improves the chance of getting access to the Temo Bokamoso microcredit facility. Armendáriz and Morduch (2010) suggested that a carefully designed microfinance programme tailor-made for the rural population should improve access of females to the finance as they are more vulnerable to poverty. The result confirms the latter explanation.

**4.4.4.2 Respondents' level of education (Educ):** While the model result establishes the existence of a positive link between the level of education of the respondents and participation in the credit scheme, it however indicates that the relationship is statistically insignificant. The odds ratio is in favour of participation to increase by a factor of 2.284799 as the respondent's literacy increases. Aschalew (2006) found that the educated are more likely to participate in credit programmes, not only in order to purchase agricultural inputs, but also to invest in farming technology and other non-farming activities since they tend to have other skills besides agriculture. Edith (2009) noted that as the level of education reduces, respondents are much more reluctant to participate in formal credit.



**4.4.4.3 Number of dependents (*Ned*);** the results indicate a positive correlation between the number of dependents and the probability of participation in the credit scheme. This positive relationship shows that the odds ratio in favour of the probability of participating increases with the number of dependents. The odds ratio in favour of participation increases by a factor of 1.404214 as household size increases by one person. The added pressure of having to cater for dependents is a motivating factor in the decision to participate in TBCS.

**4.4.4.4 Annual income from non-farming activities (*ainf*):** Theory predicted an ambiguous relationship between off-farming income and access to microfinance credit. As non-farming income improves the farmer's confidence to borrow increases with respect to the ability for repayment (Sharma and Zeller, 1997). However, considerable non-farm income reduces the need for smallholder farmers to borrow (Oboh and Kushwaha, 2009). The result obtained by the current study shows a weak positive influence of non-farming activities on participation.

#### **4.4.5 Explanation of the results for farm characteristics' variables**

**4.4.5.1 Availability of irrigation (*irrig*):** One of the biggest constraints for agriculture in Botswana is the arid conditions. Farmers often suspend agricultural activities due to drought. Availability of irrigation is usually expected to impact positively on the demand for credit, since those who have access to irrigation would be willing to farm more hectares, leading to a need for finance. The logit result indicates that access to irrigation has a significant effect at the 1% level and positively impacts on participation in the programme. This finding augurs well with the findings of ferdisa (2012) and Desale (2008) which also found a positive influence.

**4.4.5.2 Total landholding size (tlh):** The theory hypothesized that total landholding size positively influences participation in a microfinance credit scheme. An explanation to this is twofold. First, land has been traditionally used as a means of collateral in rural farming stronghold areas and that secondly, more farming land requires higher capital. Thus, the positive result produced by the results of the current study explains this hypothesis. The landholding size has yielded a positive effect on participation at 1% with an odds ratio of 3.258417.

#### **4.4.6 Explanation of the institutional variables**

***Distance from the Microfinance Institution (Dist):*** The results show this variable negatively influences participation in the scheme at a 10% level of significance. It implies that those who are more physically remote from the institution are less likely to participate in the credit scheme. The odds ratio indicates the probability of participation decreases by a factor of 0.9394723 if the respondent's residence is far from the NDB branch. This confirms the results obtained by Desale (2008) and Ferdisa (2012).

## CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

### 5.1 Conclusion

This study set out to economically assess those micro-level factors that have an impact on rural smallholders' participation in a formal credit scheme in Kweneng district, Botswana. After randomly selecting 112 rural households and analysing their survey data with the use of a binary Logit model, the study identified the determinants of participation in the microfinance scheme. These included some factors related to the farmer's characteristic being the age of the household head, their perception of group lending, and prior experience in credit use. In addition, two farm characteristics which were access to irrigation and the size of the farm, and an institutional factor which pertains to the availability of microfinance credit facilities in proximity to the villages were also found to be significant determinants.

These findings have parallels in the literature and conceptual framework that have been discussed in chapter three and four respectively. For instance, the significant effect of age on access to credit markets was confirmed in Pakistan by Shah *et al.* (2008). Group lending was found by Kifle *et al.* (2013) to improve women participation in a credit scheme in Ethiopia, while borrowing experience positively increased participation in Ethiopia (Yehuala, 2008). Furthermore, the negative effect of long distance to a credit facility goes hand in hand with the results that were obtained for a study in Malawi by Diagne (1999). The same author reported some positive impact of landholding size and access to irrigation on smallholder participation. This has also been reported in the current study.

The remaining variables were statistically insignificant, but their coefficients carried important indications on the direction (whether positive or negative) of their effect on participation. They include respondents' educational level, gender (being a female), number of dependents in the household and annual income from non-farming activities. The latter had a negative effect on participation while gender and the level of education positively affected scheme participation.

A second objective was to determine the impact of participation in the credit scheme on the welfare of the respondent households. The study found that it had a positive and significant effect on rural welfare, which validates the Botswana government's policy of investing significantly in such schemes through the vehicle of the National Development Bank and is in line with findings in studies like Atieno (2001). Finally, the third objective of recommending approaches to improving participation and its effectiveness is addressed in this chapter.

## **5.2. Recommendations**

### **5.2.1. Policies that address the farmer's socio-economic characteristics**

Major policy implications emerge from this study for the government of Botswana. Firstly, it emphasizes the importance of appreciating farmer's socio-economic characteristics in formulating policies that address the demand side in developing rural credit markets. For instance development finance policies that promote financial support to older people who are interested in venturing into agricultural activities would contribute in a significant way to rural poverty alleviation. Older people have been shown in this study to have a greater appetite to participate in the TBSC. Similar innovative agro-based schemes that target older people should be extended to villages in the country. This would go a long way in boosting agricultural output and help the country diversify

its economy, which is currently heavily depended on the mining sector. The youth who are interested in participating in similar programmes can be encouraged to join group-based borrowing schemes as that provides social collateral. Most respondents in this study indicated that group based lending could help improve their access to finance. Therefore, the youth who are keen on developing their career in smallholder farming can be organized into social-based borrowing since age and previous experience in credit use does not favor them.

### **5.2.2. Policies that address the farm characteristics**

Irrigation facilities and total landholding size were found to be important variables in helping smallholder farmers to get access to agro-finance in this study. The government can aim to promote potential smallholder farmers by empowering them with more land rights, including allocating larger plots that are fertile to them. This could take the form of an agrarian reform that embraces improvements in both land tenure and agricultural organization. More boreholes in areas where there are no dams can be dug to allow irrigation projects. The Land Board of Botswana can issue letters that confirms land title to the smallholder farmers to improve bankability for their projects on the land. In fact, properly designed land tenure would spell out a set of rights that determines who owns and how to use the land. This will have ramifications in all aspects which concerns development banks, including mortgage, size of the land, pasture, water and tenancy.

### **5.2.3. Policies that address the Institutional characteristics**

Institutional factors were found to be important in helping to improve accessibility of finance to smallholder farmers. Long distances travelled by village dwellers when they need financial support puts them at a disadvantage. For instance, there is no NDB branch in Kweneng district and farmers

have to travel to Gaborone to apply or even enquire about available services. In fact all of NDB's four branches are in towns and there are no branches in rural areas. This pushes smallholder farmers to turn to informal credit schemes. The widespread participation in informal credit betrays a dire necessity for farmer-oriented financial services in rural Botswana. This accentuates a need to link formal credit institutions with developed financial systems so that they can develop sustainable products that overcome the problem of geographical inaccessibility.

### **5.3 Limitations of the study**

The study area covered only one of the 11 districts of Botswana, namely Kweneng district. The implication is that generalising the findings to other districts or over the national territory may not be valid due to socio cultural and other economic differences. Cross sectional data was also collected at only one period of time due to the limited time available for the study, so the findings may not also be applicable to the population over a more sustained period. Due to limited human and financial resources the study of impact on welfare was restricted to only 112 respondents and secondary data on the study area and population was also very limited. These conditions limited the thoroughness of the study.

### **5.4 Areas of further study**

This study's scope was limited to credit participation for smallholder farmers due to financial and time constraints. Future research could include other microfinance services like farming insurance, micro-saving, and group lending. Further research on the determinants of participation in credit schemes should also cover all districts of the country. Greater accuracy of results would require more resources, particularly more time, researchers and financing.

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## Appendix I - Questionnaire

### *The Determinants of participation in microfinance and its impact on rural welfare: Case Study of the National Development Bank Botswana's Temo Bokamoso Lending programme in Kweneng District.*

The objective of this questionnaire is to collect information from participants and non-participants in the TBCS which will enable the research team to identify the factors that determine participation in microfinance and its impact on rural household incomes in Kweneng district. The data gathered will be used for research purposes only. Kindly provide genuine responses to the questions to optimise the validity of the study.

Thank you in advance for your cooperation

#### **Section I: socio Demographic information**

1. Respondent's Name -----

1.1. Tick as appropriate for TBCS - Participant:    Nonparticipant

2. Address -----

-----

-----

3. Age -----, Gender -----

4. Marital status (*tick*):            1. Single 2. Married 3. Divorced 4. Widowed

5. Level of Educational: 1. None 2. Primary 3. Junior secondary 4. Senior secondary 5. Tertiary

6. Profession:            1. Farmer 2. Business 3. Civil servant 4. If other specify-----

#### **SECTION 2: Household livelihood information**

7. Number of dependents (Household members below 15 and above 64) -----

8. What are the main sources of the household livelihood? (Tick more than one if applicable)

Activity	Tick ( $\sqrt{\phantom{x}}$ ) the source	Amount
Farming		

Full time employment private sector		
Full time employment public sector		
Small business		
Wage labor		
Ipelegeng grants		
Others/ specify		

### Section 3: Credit history

**9.** Did you have prior access or experience with a credit scheme?

1=Yes 0=No

**10.** If Q9 is yes, what was the purpose(s) of the loan?

1. Purchase of land 2. Acquisition of agricultural inputs 3. Livestock purchase 4.

Irrigation/borehole 5. Trade 5. Other, specify? -----

**11.** On which date did you first join the Temo Bokamoso programme? -----

**12.** Have you employed any other sources of credit?

1 = yes 0 = No

**13.** If Q12 is 'yes', state the source?

1) CEDA Young Farmers' Fund 2) Village Money lenders 3) Friends/Family 4)

Commercial Banks 6) other development programmes 7. Others specify-----

**14.** How often did you access these sources in the past 5 years?

Source	Year	Amount	Interest rate
a)-----	-----	-----	-----
b)-----	-----	-----	-----
c)-----	-----	-----	-----

**15.** Have you repaid the loan from these sources? 1= Yes 0 = No

**16.** Do you consider the Temo Bokamoso repayment period to be appropriate? 1= Yes 0 =No

**17.** If Q16 is no, recommend a suitable repayment period: \_\_\_\_\_

**18.** What your experience with the service satisfactory? 1= Yes 0 = No

**18.1** What is the distance in kms from your residence to the nearest NDB branch? -----

**19.** What is your personal perception of group collateral?

1. It is an option I would appreciate 2. It is not an option I would appreciate

**SECTION 4. WELFARE /LIVING CONDITIONS OF RESPONDENTS**

**20.** Please provide the following details on the assets of your household besides the farmland.

Type	Value of assets held before joining scheme	Value of assets held currently
Furniture and fittings		
Motor vehicles		
Electronic appliances		
Farming equipment		
Livestock		
Other		
Total		

**21.** Have you made any improvements to your house since participating in Temo Bokamoso?

1=yes 0=No

**22.** If Q21 is 'yes' what are these improvements?

1. Built a better house
2. Built additional rooms
3. Refurbished the house
4. Other, please specify-----

**23.** Do you have a title deed in your name for your farm land? 1=yes 0=No

**24.** What is the size of your farm in hectares? -----

**25** Do you have access to a borehole/irrigation? 1=yes 0= no

**26.** If Q23 is yes then is the farm fertile? \_\_\_\_\_ 1= fertile 0= not fertile

**27.** If Q25 is 'yes'

1. What percentage of the farmland did you plough on average before participating in TBSC? --

2. If you do not participate, what proportion have you ploughed on average in the last 5 years?

28. What was annual income from farming before participation? -----Current annual farming income -----

29. For nonparticipants what was your annual income from farming: 5 years ago activity after programme participation? ----- Currently-----

## **SECTION 5: Household income, and access to Medical Facilities, education and other social amenities**

30. Please provide average expenditure on the following in the last 5 years:

Amenity	Year 1	Year 2	Year 3	Year 4	Year 5
Healthcare					
Education					
Utilities					
Leisure activities					

## **Part 6: Respondents opinions on participation**

31. Why do you think is the main reasons people participate in TBCS?

A. To invest in the farm      B. To repay loans      C. To invest in non-farming activities

D. To purchase livestock      E. To buy basic items      F. For precautionary purposes

G. Others (specify) \_\_\_\_\_

32. What needs to be done in your opinion to improve the level of participation and its effectiveness -----

-----

-----

## Appendix II Output from Home Stata

**. logistic partic age sex educ ndep pexcr rpgc ainf dist irrig tlh, coef**

Logistic regression	Number of obs	=	112
	LR chi2(10)	=	110.07
	Prob > chi2	=	0.0000
Log likelihood = -22.524715	Pseudo R2	=	0.7096

partic	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.2108542	.0843595	2.50	0.012	.0455128	.3761957
sex	.7863108	.8623268	0.91	0.362	-.9038187	2.47644
educ	.8262782	.7724757	1.07	0.285	-.6877464	2.340303
ndep	.3394774	.3038961	1.12	0.264	-.256148	.9351029
pexcr	1.138913	.6673403	1.71	0.088	-.1690503	2.446876
rpgc	4.557811	1.565127	2.91	0.004	1.490218	7.625404
ainf	-.4389707	1.253057	-0.35	0.726	-2.894917	2.016976
dist	-.0624369	.0336016	-1.86	0.063	-.1282948	.0034209
irrig	3.282829	1.246216	2.63	0.008	.8402901	5.725367
tlh	1.181242	.3667218	3.22	0.001	.46248	1.900003
_cons	-22.00342	8.190335	-2.69	0.007	-38.05618	-5.950661

**. logistic partic age sex educ ndep pexcr rpgc ainf dist irrig tlh**

Logistic regression	Number of obs	=	112
	LR chi2(10)	=	110.07
	Prob > chi2	=	0.0000
Log likelihood = -22.524715	Pseudo R2	=	0.7096

partic	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
age	1.234732	.1041613	2.50	0.012	1.046564	1.456732
sex	2.195283	1.893051	0.91	0.362	.4050201	11.89883
educ	2.284799	1.764952	1.07	0.285	.5027077	10.38438
ndep	1.404214	.426735	1.12	0.264	.7740274	2.547475
pexcr	3.12337	2.084351	1.71	0.088	.8444665	11.5522
rpgc	95.37446	149.2732	2.91	0.004	4.438063	2049.608
ainf	.6446997	.8078454	-0.35	0.726	.0553036	7.515562
dist	.9394723	.0315677	-1.86	0.063	.8795941	1.003427
irrig	26.65105	33.21296	2.63	0.008	2.317039	306.5457
tlh	3.258417	1.194933	3.22	0.001	1.588007	6.685915



summarize dist age educ ndep tlh

Variable	Obs	Mean	Std. Dev.	Min	Max
dist	112	47.88393	14.63166	10	70
age	112	41.85714	9.520823	26	64
educ	112	4.598214	.7528902	2	5
ndep	112	5.419643	2.133552	1	12
tlh	112	6.723214	2.39071	2	11